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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,536	09/15/2003	Jean Joseph Botti	DP-300006	2268

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EXAMINER	
WALTERS, JOHN DANIEL	
ART UNIT	**PAPER NUMBER**
3618	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,536	BOTTI ET AL.	
	Examiner	Art Unit	
	John D. Walters	3618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/5/05*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6,7,10-12,15,18,19,22 and 23* is/are pending in the application.

4a) Of the above claim(s) *18,19,22 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) *6* is/are allowed.

6)☒ Claim(s) *1-3,7,10-12 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1 – 3, 6, 7, 10 – 12, and 15 have been examined. Claims 18 – 25 have been withdrawn via election of species. Claims 4, 5, 8, 9, 13, 14, 16, 17, 20, 21, 24, and 25 have been canceled by Applicant.

Election/Restrictions

The restriction requirement dated 08-11-2004 required an election between three species. In response, Applicant elected to prosecute Species II, Subspecies I (Figures 1, 3, and 5). Applicant identified all claims (1-25) as reading on the elected species.

As noted on the last Office Action dated 05-05-2005, the Examiner disagrees that claim 18 "reads" on the elected species, as claims 18 is drawn toward a free piston gas generator, which is associated with non-elected Species I. Due to this, claim 18 is withdrawn from consideration.

Note that claims 19 – 21 are also withdrawn from consideration, as they depend from claims 18.

The Examiner also disagrees that claim 22 reads on the elected species, as claim 22 is drawn toward a turbo-generator system, which is associated with non-elected Species III. Due to this, claim 22 is withdrawn from consideration.

Note that claims 23 – 25 are also withdrawn from consideration, as they depend from claim 22.

Accordingly, in summary, claims 18 – 25 are withdrawn from consideration, as being drawn toward a non-elected species. Applicant is requested to either cancel the

withdrawn claims, or, when applicable, to make the claims depend upon an allowable generic claim.

Accordingly the "status identifier" for claims 18 – 25 on the above amendment should have read "(withdrawn)", as opposed to "(original)".

Regarding the above election and as also noted in the last Office Action, because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement in the election dated 09-13-2004, the election has been treated as an election without traverse (MPEP § 818.03(a)).

While the Applicant discussed claims 18 – 25 on pages 11 and 12 of the "Remarks" portion of the above amendment, this "discussion" was, as best understood, never explicitly related to a "traversal" of claims 18 – 25 not reading on the elected species. The remarks concerning claims 18 – 25 mentioned above is believed to be related to the drawing objection to Figure 4 in the previous Office Action. Accordingly, the restriction requirement is still deemed proper and is therefore made FINAL.

An action on the merits of elected Species II, Subspecies I, claims 1 – 17 follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 7, 10, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rae (3,040,519) in view of Manikowski (5,706,675). Rae discloses an extended rich mode engine having an intake and an exhaust, said extended rich mode engine configured to produce a substantially continuous optimized hydrogen rich engine exhaust (see claim 6).

Regarding the term "optimized" in recited claim 1, note also that lines 8 and 9 of page 9 of the specification recites "The present system and method optimizes (increases) the hydrogen content of the engine exhaust". From this, the word "optimizes" merely means any increase in the hydrogen content of an exhaust above stoichiometric. Note this is consistent with a "hydrogen rich exhaust".

Regarding claim 7, note that since the fuel is burned internally, as opposed to externally, such as in a steam turbine, where fuel is "burned" in a boiler or nuclear reactor, that the engine of Rae is an "internal combustion engine".

Regarding claims 10 and 15, note that the fuel is burned as a result of compression, as opposed to being ignited with a spark plug.

Rae does not disclose an oxygen enrichment device having an oxygen stream effluent with said engine intake wherein said oxygen enhancement device is any of a number of varieties listed within claim 1. Manikowski, however, discloses a high efficiency oxygen/air separation system in which an oxygen air separator (Fig. 2, item 53) is which has an oxygen stream in fluid communication with an engine intake (Fig. 2, item 67). It would have been obvious to one of ordinary skill in the art at the time of

applicant's invention in order minimize or eliminate NO_x and greatly reduce Carbon monoxide and soot emissions (column 4, lines 15 – 18).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rae (3,040,519) in view of Manikowski (5,706,675) as applied to claims 1, 7, 10, 11, and 15 above, and further in view of Houseman (4,041,910). Rae in view of Manikowski does not disclose the use of spark ignition for their internal combustion engine. Houseman teaches an extended rich mode engine having an intake and an exhaust, said extended rich mode engine configured to produce a substantially continuous optimized hydrogen rich engine exhaust. Said engine includes spark plugs (column 3, line 62).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to combine the spark ignition of Houseman with the engine system of Rae in view of Manikowski in order to allow said engine to generate extra power and form H_2 and CO within the cylinders using spark ignition (bottom of column 3 and top of column 4).

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rae (3,040,519) in view of Manikowski (5,706,675) and Houseman (4,041,910) as applied to claims 1, 7, 10 - 12, and 15 above, and further in view of Houseman (3,982,910). Rae in view of Manikowski and Houseman ('1,910) fail to teach that the combined concentration of hydrogen and carbon monoxide is greater than about 30% of the engine exhaust running in the fuel rich condition.

However, Houseman ('2,910) teaches a gas generator that generates a hydrogen rich exhaust (abstract) that is utilized in a lean engine (91 – Figure 8) that has a concentration of carbon monoxide and hydrogen, by volume, at an air fuel ratio of 7:1 of approximately 38% (Figure 3 – by adding ordinate values for CO and H_2 at an abscissa value of 7). A hydrogen and carbon monoxide exhaust concentration by volume of greater than 30% is advantageous in that the hydrogen rich exhaust concentration percentages of Houseman ('2,910) may be used as fuel in the lean cylinders of Houseman ('1,910) to promote fuel efficiency and reduce emissions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to utilize a hydrogen rich exhaust with the concentration of hydrogen and carbon monoxide in excess of 30% in the hydrogen rich exhaust of Houseman ('1,910) as taught by Houseman ('2,910).

Regarding claim 3, note that Houseman ('1,910) teaches the use of an air fuel ratio of as low as 6.5 to allow an even richer hydrogen exhaust (lines 51 – 58 of column 4). From Figure 3 of Houseman ('2,910), an air/fuel ratio of 6.5 corresponds to a combined concentration of hydrogen and carbon monoxide of 44%. Note also that the claim 19 recitation of "about 50%" implies a tolerance. The Examiner then refers to case law to attempt to quantify this tolerance. Note that in a recent court decision, *In re Lance G. Peterson and Ioannis Vasitis* decided 01-08-2003 by the US Court of Appeals, it was affirmed that a claim recitation of "about 14 percent chromium" is unpatentable over a prior art reference that teaches "12% chromium". From this, it is considered reasonable to assume that the "tolerance" may be quantified as: 12/14 = .86, or plus or

minus 14% of the stated values preceded by the word "about". From this, we see that the (+ or -) "tolerance" on the claim 19 recitation of "about 50%" is 50% x .86 and 50% x 1.14. This results in the recitation of "about 50%" to mean from 43 to 57%. From this, it is seen that the combined concentration of hydrogen and carbon monoxide of an air/fuel ratio of 6.5 of Houseman ('2,910) of 44% is "greater" than the claim 19 recitation of "greater than about 50%", which is interpreted to mean, from case law, "greater than 43 to 57%".

Allowable Subject Matter

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

Applicant's arguments, see page 3, filed 8/5/2005, with respect to the Abstract have been fully considered and are persuasive. The objection of 5/5/2005 has been withdrawn.

Applicant's arguments, see pages 2 and 3, filed 8/5/2005, with respect to the specification have been fully considered and are persuasive. The objection of 5/5/2005 has been withdrawn.

Applicant's arguments, see pages 7 and 8, filed 8/5/2005, with respect to the drawings have been fully considered and are persuasive. The objection of 5/5/2005 has been withdrawn.

Applicant's arguments, see page 4, filed 8/5/2005, with respect to claims 1 – 17 and the phrase "extremely rich of stoichiometric" have been fully considered and are persuasive. The objection of 5/5/2005 has been withdrawn.

Applicant's arguments, see page 5, filed 8/5/2005, with respect to claim 11 grammar have been fully considered and are persuasive. The objection of 5/5/2005 has been withdrawn.

Applicant's arguments, see pages 8 and 9, filed 8/5/2005, with respect to 112 rejections of claims 10 and 11 have been fully considered and are persuasive. The rejection of 5/5/2005 has been withdrawn.

Applicant's arguments, see page 4, filed 8/5/2005, with respect to the rejection(s) of claim(s) 1, 4, 7, 8, 10, 12, 13, 15, and 16 under 35 U.S.C. 102(b) have been fully

considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the current Office Action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John D. Walters whose telephone number is (571) 272-8269. The examiner can normally be reached on Monday - Friday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Ellis can be reached on (571) 272-6914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John D. Walters
Examiner
Art Unit 3618

JDW

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